

To: Kate Schalk

From: RP Nolan

Date: March 28, 2004

Re: Charge for the WTC Peer Consultants

Charge Question 1: The Confirmation Cleaning Study concluded that “asbestos air sampling was a conservative method for determining if additional cleaning was required.” Given this conclusion and its supporting data in the Confirmation Cleaning Study and all other data sources, is the selection of asbestos as a surrogate for determining the risk from other contaminants supported? Please provide a detailed response, explaining the reason for your yes or no answer.

Answer 1: Yes, if the cleaning is effective enough to reduce the asbestos concentrations below the health-based benchmarks it is reasonable to assume the other five contaminants of potential concern (COPC) are below their benchmarks as well. The COPC were selected after screening for over 300 substances using more than a quarter of a million analyzes of air and settled dust samples. The substances analyzed for were wide ranging, many classes of organic compounds (pesticides, volatile organic compound (VOCs), semi-volatile organic compounds (SVOCs), dioxins, PCBs, PAHs) and inorganic compounds (asbestos, crystalline silica (more specifically quartz), various metals, synthetic vitreous fibers) were included in the screening. Samples were collected from the general and residential environments to determine if the events of 9/11 elevated the concentrations of any of these many substances.

From this screening study six contaminants of potential concern (asbestos, quartz, synthetic vitreous fibers (SVF), dioxin, lead and polycyclic aromatic hydrocarbons (PAHs)) were identified. The COPC can be divided into two groups, substances commonly used in construction (asbestos, quartz, synthetic vitreous fibers and lead) and substances associated with combustion products from the jet fuel and the resulting fires (dioxins and PAHs). The two COPC present at the highest concentrations in the settled dust were synthetic vitreous fibers (a group of man-made mineral fibers that includes fiber glass) and quartz. At lower concentrations, asbestos and lead, are present in a high

percentage of the settled dust samples analyzed. One report on air and settled dust samples collected shortly after 9/11 reported the presence of several asbestos fiber types (chrysotile, amosite and a sodium rich tremolite called richterite). Later analysis on more samples reported chrysotile asbestos to be the only asbestos fiber type present. All of the COPC are commonly found in the urban environment and therefore analytical results will not provide a “fingerprint” for WTC related dust indoors. However, the analytical data as a whole indicated the concentrations of the six COPC in Lower Manhattan were considered higher than one would expect when comparing them to background levels in areas of Manhattan not affected by 9/11.

These results are consistent with what is known about the composition of the WTC fireproofing and the construction materials in common use during the period in which it was built.

The combustion products – dioxin and polycyclic aromatic hydrocarbons (PAHs) - are not single compounds but rather classes of chemical compounds made up of structurally related individual chemical compounds which have a range of toxicological and carcinogenic properties. The analyzes of these compounds undertaken by the EPA and their co-workers attempted to treat these two groups in a manner which addresses the range in carcinogenic potency associated with the various individual chemical compounds. The very low concentration of these complex mixtures of organic chemicals makes monitoring for them problematic. For example, dioxin was present at a concentration of about 0.001ng per cubic meter in the air and requires days to collect one air sample. The analysis of such low concentrations is time consuming - leading to long turn around times, ending with results that are unlikely to generate much information useful for public health policy. In addition exposure to dioxin by dietary intake is usually more significant than inhalation. Although PAHs are present at higher concentration many of the same arguments can be applied to this complex mixture of individual chemical compounds.

Review of the documents provided indicates that the six contaminants of potential concern are aptly named in that they are of potential concern. None of the six contaminants are present in air or settled dust at concentrations which present a clear and present danger and each is known to occur in the urban environment. The information available indicates that the events of 9/11 increased the level of these six contaminants in Lower Manhattan above the historical background that would normally be expected. This statement applies mainly to settled dust as the airborne concentrations of contaminants returned to levels similar, if not within, background weeks to a few months post-9/11. Little is known about the very heavy exposures to airborne particulates on and for about a week after 9/11. It is important to keep in mind that while the six COPC are all present at low concentrations in the settled dust there is a lot of settled dust and the assistance offered to aide in establishing an effective cleaning protocol, residential cleaning and air monitoring seems justified based on the data provided.

The setting of the health-based benchmarks and the development of the cleaning protocols appear to have occurred almost simultaneously. The following are the health-based benchmarks developed for post cleaning evaluation:

COPC	Indoor Air	Settled Dust
Asbestos	0.0009f/mL	n/a
Quartz	5µg/m ³	n/a
SVF	0.01f/mL	n/a
Lead	0.7µg/m ³	25µg/ft ²
Dioxin	0.001ng/m ³	2ng/m ²
PAHs	0.2µg/m ³	150µg/m ²

These six health-based benchmarks were developed in a logical manner under an extremely demanding time schedule. Although reasonable people might argue about the details, exactly what the indoor air levels should be, setting as a goal a lifetime risk of 1 excess death in 10,000 and using exposure by inhalation seems a reasonable approach based on the information presented in the reports. The IRIS asbestos risk assessment is not specific for chrysotile asbestos, the asbestos fiber type found in the air and settle dust in Lower Manhattan post- 9/11, but rather a sort of average of the different types from the available asbestos epidemiology. However, using an over estimate for the risk of asbestos-related disease helps to justify using it as a surrogate for the other five COPC. Other arguments could be made about the quartz and SVF exposures that the risks are likely to be quite a bit lower than those estimates given in the benchmarks.

The cleaning protocol was validated by using it to clean a heavily contaminated, mixed use building, on Liberty Street. The cleaning protocol required the use of HEPA vacuums that efficiently collect and trap any particulate matter – asbestos, lead, SVF or quartz. The PAHs or dioxin would most likely be on the surface the particulate matter and be vacuumed up with the particulates. In addition the vertical and horizontal surfaces were clean by wet wiping. This protocol was then used to clean 3,400 apartments in 480 buildings each with post-cleaning air monitoring and another 800 apartments with only air monitoring. The cleaning and air monitoring effort addressed a significant percentage of the apartments in Lower Manhattan as the 2000 Census reports 16,482 housing units within three quarters of a mile of the WTC. As inhalation was the route of exposure for the health-based benchmarks after cleaning the apartments were air sampled in an effort to demonstrate that airborne asbestos levels were below 0.0009 fibers of asbestos (greater

than 5µm in length) per milliliter of air. These air samples were not collected under passive conditions but rather leaf blowers or fans were used to generate air movement considerably above what normally occurs in apartments. If the settled dust was not adequately cleaned up it would be re-entrained into the air and the air sampling would be able to determine if the health-based benchmark was exceeded. The air sampling undertaken for the asbestos would also identify any SVFs which were airborne post-cleaning.

Charge Question 2: Do other contaminants that were measured in the Confirmation Cleaning Study provide equally good or better surrogates for determining the risk from other contaminants? If yes, please describe in detail which contaminants you would consider and why. If no, provide a justification for your response.

Answer 2: No, analysis of none of the other five COPC are equally good or better than using asbestos. Of the six COPC the best scientific case for non-occupational exposure leading to increased risk of cancer, particularly mesothelioma, can be made for asbestos and therefore monitoring for asbestos post-cleaning is required. As noted earlier there was a significant concentration of SVF in the WTC settled dust. The type of analysis undertaken for asbestos –fiber counting by microscopy- would indicate if increased airborne levels of SVF were occurring in the apartments post-cleaning and therefore monitoring for SVF is not necessary. The quartz and lead would be predominantly in particulate form and the HEPA vacuuming, effective enough to remove relatively high concentrations of SVF and relatively low concentration of asbestos should be effective at removing the two types of particulates. It is worth noting that this type of vacuum was used to clean sites contaminated with anthrax.

Charge Question 3: Do the reviewers know of any other contaminants associated with the World Trade Center that were not included in the COPC document or the Confirmation Cleaning Study that may serve as a surrogate for determining the risk from other contaminants? If so, please provide the details regarding these contaminants and the reasons why they should be considered. Provide citations for any references mentioned and/or submit hard copies of the referenced documents.

Answer 3: No. EPA has opined in the reports provided that occupational standards should generally not be used as a basis for environmental health criteria and that exposure data for the very intense exposures post-9/11 are not available. The argument is given that those occupationally employed are healthier than the general population which includes individuals of different ages and health status than the working population and

these considerations are not reflected in occupational standards. It seems that two important sources of information have not been evaluated which would be useful. Were hospital records reviewed for admissions of sensitive populations for example asthmatics post-9/11? Did the NYC mortality post-9/11 show any trend like those reported for the acute air pollution episodes in London with smog from December 5 to the 9 in 1952?